times and high tissue temperatures, resulting in unnecessary collateral tissue injury. This study tested the ability of bipolar RF energy to create transmural lesions on the beating heart that would permanently isolate atrial myocardium.
METHODS: Baseline pacing on 6 dogs was performed on the following target areas: right and left atrial appendage, superior and inferior vena cavae, and right and left pulmonary veins. A cuff of atrial myocardium, proximal to the target tissue was clamped between the two arms of the bipolar device to produce continuous circumferential linear lesions from the epicardium. RF energy (56 Watts) was delivered until tissue conductance between the electrodes fell to a stable minimal level of 0.0025 Mhos. Following ablation, pacing documented acute isolation. Animals were survived for 30 days and permanent isolation was evaluated by pacing studies utilizing a 256-channel atrial mapping system. Histology was evaluated by H&E and Trichrome stain.
RESULTS: 34 lesions were made at the initial surgery. Mean ablation time was 4.9 ± 1.6 seconds and mean peak tissue temperature was 46.6 ± 3.0 °C. All lesions (34/34) acutely and permanently isolated atrial tissue. Mapping studies with pacing of atrial tissue on both sides of the lesion confirmed isolation. Histology demonstrated that all lesions were linear, continuous, and transmural with no thrombus formation or stenosis. The average maximum width for all lesions was 1.9 ± 0.7 mm (range 1.0 to 3.0). Lesions were produced up to a length of 50 mm and a depth of 8 mm.
CONCLUSION: Bipolar RF energy rapidly produced permanent transmural linear lesions on the beating heart with a single application. Real time measurement of tissue conductance reliably predicted lesion transmurality. This new technology should enable a curative minimally invasive operation for AF on the beating heart.

1147-43 Does Off Pump Coronary Artery Bypass Graft Surgery Reduce Post-Operative Right Ventricular Dysfunction?

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Background: Coronary artery bypass grafting (CABG) on the beating heart without cardio-pulmonary bypass ('off pump') has gained increasing popularity. Numerous advantages over on-pump surgery, including improved post-operative ventricular function, have been cited. We compared the effect on postoperative ventricular function of the 2 methods using tissue Doppler echocardiography (TDE). This technique allows the objective and non-invasive measurement of regional myocardial velocities. Methods: 20 patients with 3-vessel coronary artery disease undergoing elective CABG were included. 10 had on-pump and 10 had off-pump procedures. Each had pulsed wave TDE images obtained from the apex, providing visualisation of the tricuspid free wall annulus and 4 regions of the mitral valve annulus. Systolic and diastolic velocities were compared immediately before and 5 days after surgery. Results: Both groups were comparable in terms of demographics and disease severity. All subjects had a left internal mammary artery graft with a mean of 2.5 vein grafts to the other vessels. All had a graft to the right coronary system. Compared to baseline, both on and off-pump groups showed a marked decrease in the right ventricular (RV) peak systolic and diastolic velocities (Table). While the reduction in velocities was less in the off-pump group, the difference between the two groups failed to reach statistical significance. Conclusions: There is significant RV dysfunction after CABG with both on and off-pump techniques.

Mean Change in Peak Velocity (cm/s) (*p<0.01 from baseline)

	RV Systolic	RV Diastolic	LV Systolic	LV Diastolic
Off-pump	-6.5±1.2*	-5.0±0.8*	0.4±0.4	0.8±0.7
On-pump	-5.2±1.3*	-3.9±0.8*	0.4±0.6	0.9±0.8

1147-44 Late Follow-Up of the Warm Heart Trial: Eight-Year Results

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Background: The Warm Heart Trial randomized 1,732 patients undergoing coronary artery bypass graft surgery to warm or cold blood cardioplegia. Warm patients had significantly less non-fatal perioperative cardiac events and 30-day mortality was non-significantly decreased (1.4% vs. 2.5%, p=0.12). The purpose of this study was to evaluate the long-term outcomes of these patients to determine if different techniques for myocardial protection affect survival or hospital readmission for non-fatal, late cardiac events. **Methods:** Late outcomes were obtained by merging clinical trial and population-based, administrative databases. **Results:** Long-term outcomes were determined for 96% of the original patients. Median follow-up was 85 +/- 20 months for mortality, and 81 +/- 32 months for mortality or hospital readmission. Maximum follow-up was 101 months. Baseline clinical, angiographic and operative characteristics were similar between the Warm and Cold groups. Late survival was non-significantly greater in the Warm group (84.7 +/- 1.4% vs. 82.4 +/- 1.6%, p=0.30) with an adjusted relative risk of 0.861 in multivariate models (95% confidence interval 0.668-1.109, p=0.25). Freedom from mortality or hospital readmission for non-fatal late cardiac events was also non-significantly greater with warm cardioplegia (61.8 +/- 2.0% vs. 58.7 +/- 2.2%, p=0.74). Hospitalization for non-fatal late cardiac events was similar between cardioplegia types. **Conclusions:** Despite improved perioperative outcomes with warm cardioplegia, analysis of late outcomes did not demonstrate any substantial advantage over conventional methods of myocardial protection.

ORAL CONTRIBUTIONS

851 Stable Ischemic Syndrome I: Advances in Diagnosis, Prognosis, and Therapy

Tuesday, March 19, 2002, 10:30 a.m.-Noon
Georgia World Congress Center, Hall D2

10:30 a.m.

851-1 Effect of the Angiotensin II Type 1 Receptor Blocker Candesartan on Cardiovascular Events

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Background: Angiotensin II may play an important role in the pathogenesis of coronary artery disease. We assessed the effect of the angiotensin II receptor blocker candesartan in patients at high risk for cardiovascular events. Methods: A total of 406 patients were randomly and prospectively assigned to a candesartan group (4 mg/day) or a control group. All patients had a history of coronary intervention, and had no significant coronary stenosis on follow-up angiography 6 months after intervention. The primary endpoint was a composite of revascularization, nonfatal myocardial infarction, or death from cardiovascular causes. The secondary endpoint was hospitalization due to cardiovascular causes (worsening angina or heart failure). Results: There were no differences between the two groups in clinical characteristics. Discontinuation of drug administration was required for only 9 patients, due to hypotension or dizziness. Neither the blood pressure at baseline nor that at follow-up differed between the groups. There were 62 cardiac events over a mean follow-up period of 24 months. Treatment with candesartan reduced primary endpoint risk (6.2%, compared with 12.3% in the control group; relative risk, 0.49; 95 % confidence interval, 0.25 to 0.98; P=0.04) (revascularization occurred in 8 cases in the candesartan group and 15 cases in the control group, nonfatal myocardial infarction in 2 and 1 cases, and death in 2 and 9 cases, respectively). The frequencies of secondary endpoints did not differ significant between the two groups (worsening angina occurred in 9 cases in the candesartan group and 14 cases in the control group, and heart failure in 0 and 2 cases, respectively). The frequencies of all cardiac events were significantly lower in the candesartan group (10.8%) than in the control group (20.2%, P=0.03). Conclusion: Candesartan was beneficial for preventing cardiovascular events in high-risk patients.

10:45 a.m.

851-2 Detecting Myocardial Ischemia From Four Bipolar Leads Reconstructed From the Unipoles That Are Potentially Available in Implanted Devices

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Background: The technology to detect myocardial ischaemia using right-sided cardiac electrodes can be useful in implanted devices, such as cardiac pacemakers and implantable cardioverters defibrillators. This study investigated the diagnostic accuracy of monitoring myocardial ischaemia from intracardiac recordings during elective percutaneous coronary angioplasty.
Method: Forty-eight patients were investigated with a total of 194 balloon inflations (23 left anterior descending, 2 diagonals, 8 circumflex, 5 obtuse marginals and 23 right coronary arteries). Standard 12-lead ECGs were compared with reconstructed bipolar recordings: pectoral-right ventricle (PEC-RV), superior vena cava and RV (SVC-RV), right atrium-RV (RA-RV) and coronary sinus-RV (CS-RV).
Results: The graph below displays median of ST segment deviation from baseline in the respective leads during the first 30 seconds of balloon inflation, for all arteries. Compared to the best surface lead from the 12-lead ECG (V2), the bipolar leads were superior in detecting ischaemic ST changes (p<0.0001, Wilcoxon matched pairs test).
Conclusion: Monitoring regional myocardial ischaemia, irrespective of the epicardial artery involved from right-sided intracardiac electrodes is feasible, and may be incorporated into the algorithms of implanted devices to improve their diagnostic and therapeutic strategies.